

***ASSESSING THE VIABILITY OF A “WATER SHOP
FRANCHISE BUSINESS” TO SUPPLY SAFE AND
AFFORDABLE WATER TO SELECTED
LOCATIONS WITHIN THE ACCRA METROPOLIS,
GA EAST & GA WEST DISTRICTS***



GE WATER TECHNOLOGY

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WEST DISTRICTS**



By

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Applied Project Report submitted to the Department of Business
Administration, Ashesi University College in partial fulfillment of the
requirements for the award of Bachelor of Science degree in Business
Administration

DECLARATION

I hereby declare that this applied project report is the result of my original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:

Candidate's Name:

Date:

I hereby declare that the preparation and presentation of the Applied Project Report were supervised in accordance with the guidelines on supervision of applied projects laid down by Ashesi University College.

Supervisor's Signature.....

Supervisor's Name:

Date:

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Abstract

Access to potable water is among the major challenges faced by developing countries in both urban and rural communities. Most residents rely on unhygienic water due to the public distributor's inability to ensure consistent supply. Consequently, there is the need for individuals, groups, institutions, governments and multinational companies to find ways to curb the problem of inaccessibility, unaffordability and scarcity of potable water which leads to water-borne diseases in Africa specifically in the rural and urban areas of Ghana.

This study examined the the viability of a water shop fanchise business model to supply safe and affordable water to residents in selected locations within the Accra Metropolis and Ga East and West districts. The study was mainly conducted in few selected locations in Accra Metropolis and Ga East and West districts where potable water is believed to be scarce, unaffordable, inaccessible or too expensive for the urban poor. The study aimed at understanding the needs and challenges faced by local producers and consumers, and then examined the viability of the franchise business model by conducting a market sizing and analyzing the financial projections.

The findings revealed that although most residents in the Accra Metropolis and Ga East and West districts are connected to the GWCL distribution system, most residents do not get consistent water supply. As such, they rely on other alternatives such as bottled water, sachet water and water tanker vendors for domestic consumption. However, a site visit to some local production firms revealed that production is done under unhygienic practices such as unreliable water sources, improper filtration and storage of water. There is a need for both drinking water and bulk water in Greater Accra Region region specifically in the Accra Metropolis and Ga East and West districts. Further details are outlined in the main report.

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CHAPTER ONE

Introduction

1. Background to study

Water covers 70% of the planet earth with 97.5% being salt water. However, out of the 2.5% of the fresh water remaining, 75% is locked up in ice and snow, leaving only 0.5% in a liquid form. Water is a basic essential commodity for life. It is also the most important factor in food production, cooking, personal hygiene, sanitation, industrial production, energy generation and economic development, hence, a determinant of the quality of life of a nation (Barot, 2007). Abraham Maslow classified water as part of the physiological needs which ought to be satisfied before any other need (Hockenbury & Hockenbury, 2006). Nonetheless, water security could be another social issue to be worried about in the future due to the mismanagement of the 0.5% fresh water available as a result of pollution, climate change and other factors (Barot, 2007). Consequently, there is the need to come up with a sustainable solution to ensure the continuous supply of water in order to mitigate the risks of not having access to potable water.

According to Ghana Water Company Limited (GWCL) January 2008 report, Ghana faces serious constraints in meeting the challenge of providing adequate water for all rural and urban residents. These include the worsening financial condition, the insufficient sector investment over the last decade and weak implementation capacity caused by staffing problems and low salary levels.

Bottled water is available everywhere, but yet expensive for some potential consumers who cannot afford the market price.



Water shop is a franchise business model owned by General Electric. It is aimed at providing potable bottled water at the price of US\$ 0.05 per liter

Proposed bottle solution

to the consumers. It will help develop the local water producing industry in selected areas of Greater Accra Region, which is dominated by small and medium enterprises, through increasing commercial vending points. This research sought to study the market and thus confirm the viability or otherwise of the proposed business model (bottled water solution). The research also recommended necessary changes to the proposed business model. (See Appendix 1)

Regardless of the efforts made by the government, private institutions, non-governmental organizations and international institutions such as the World Bank in making potable water available in both urban and rural areas, 78% of the Ghanaian population still needs to gain access to potable water by 2015 in order to meet the seventh Millennium Development Goal (MDG 7) which states that “*Reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation by 2015*” (WHO, 2010). The main sources of drinking water in Africa and specifically Ghana are from household connections (tap), bottled water, sachet water and boreholes, which most of the time have high levels of salt, iron and manganese and are even contaminated by pathogens due to poor sanitation (WaterAid, 2005).

1.1. Overview of Ghana

Ghana formerly known as the Gold Coast is a country located in West Africa bordering the Gulf of Guinea in the south and west between Ivory Coast and Togo. Ghana covers a total area of 238,533 square km with ten main regions and a total population of 23.9 million. It was the first Sub-Saharan African country to gain political independence from the British colonialists on March 6th 1957 led by Dr. Kwame Nkrumah (1909-1966). The country is currently run by President John Evans Atta Mills who took office in January 2009. Ghana is today one of the most politically and socially stable

countries in West Africa with a friendly business environment aside the instability of its currency and inflation rate (CIA World Factbook, 2009).

Greater Accra Region is a smallest area (3,245 square km) as compared to the 9 other administrative regions in Ghana. However, Greater Accra Region is the second most populated region with a growth rate of 3% as compared to the total annual population growth of Ghana which is 2.4 % based on the provisional 2010 population and housing census (Business & Financial Times, 2011).

Ghana's economy is mainly driven by the exports of gold, cocoa, timber, diamond, bauxite and manganese. The Gross Domestic Product (GDP) growth is reliant on the agricultural, industrial and services sectors. The 2010 GDP was estimated at 5.9% and inflation recorded for the month of September at 9.4% as compared to 18% in October 2009 (Bank of Ghana, 2010). However, with the production of crude oil in commercial quantities, the economic growth of Ghana is expected to be bright and strong if well managed. This will help spearhead population growth as more investors perceive opportunities.

1.2. Problem statement

Water is supposed to be shared equitably among the populace in a country. However, most poor income earners lack access to safe drinking water for many reasons. Ghana Water Company Limited (GWCL), which is currently managed by Aqua Vitens Rand Limited (AVRL), is the main supplier of water to urban Ghana. According to the communications manager of Aqua Vitens Rand the local operator of GWCL, areas of Accra such as Nungua, Dome, Adenta, Madina and East Legon just to name a few, get access to pipe borne water once or twice a week with reasons being far distance from the main distribution plants at Weija and Kpong and low pressure from the tap.

Other reasons for the GWCL's inability to serve all communities include lack of adequate infrastructure and finance for maintenance and expansion, non-revenue collection from customers, increased urbanization and poor management. However, their inability to serve all communities and districts in the Greater Accra Region coupled with the high demand for drinkable water has created significant opportunities for investors. Most investors are private firms, local entrepreneurs as well as the secondary and tertiary suppliers who play an active role in the value chain in order to curb supply shortages and ensure accessibility. However, concerns have to be raised whether the various available products and brands are safe and of good quality, affordable and accessible to all.

Statistics from WaterAid reveals that only 24% of residents in Accra Metropolis have 24 hours of water supply (WaterAid, 2005). A lot needs to be done since 76% of the residents still lack access to safe drinking water in selected areas within Greater Accra Region. As such, the research problem focuses on *the inaccessibility, scarcity and high cost of safe drinking water in the Greater Accra Region especially within the Accra Metropolis and the Ga East and West districts*. Therefore, the water shop business model will help GE to curb the scarcity of safe drinking water by providing affordable and safe drinking water in the most distressed areas of Greater Accra Region. Residents in these areas will have the assurance of a consistent supply of safe drinking water with a nearby production plant "*Water shops*" in their communities.

Objectives

1.3. General Objectives

The main objective of this research is to curb a social problem by providing a business model that helps consumers' access safe and affordable drinking water in the Greater Accra Region. The provision of this solution will require:

- 1) Understanding consumers' and operators' needs and challenges
- 2) Assessing the viability of a bottled water solution
- 3) Sizing up the market

1.4. Main Objectives

- A. To examine the viability of commercialization of safe drinking water in selected areas within Greater Accra Region
- B. To discuss the challenges faced in the access and distribution of safe drinking water in selected areas within Greater Accra Region
- C. To recommend adequate solutions to the challenges faced.

Significance of the study

Most discerning Ghanaians who can afford the high price of other alternatives of safe drinking water such as bottled water do not consume water from the tap because they perceive the water to be of low quality. Nonetheless, the urban poor who have limited income drink water from boreholes and water in sachets, which are most of the time contaminated due to poor treatment, improper storage and inadequate means of transportation to the end user. Drinking water is mostly in the form of bottled water (liter) or sachets made from the factory, local entrepreneur (500ml) and hand-tied water (700ml) made by individuals which are cheaper alternatives to bottled water (Okioga, 2007)



Source: Osu-Danquah, Dec 16th, 2010



Source: Improper storage of water in sachets

A sachet of water costs 10Gp whilst the bottles cost 70 Gp and above, depending on the size, brand and vending point. Market competition and the National Association of Water Sachet Producers were able to maintain the price of water in sachets at 5 pesewas; however due to the January 2011 increase in fuel price, the price of water in sachet has surged to 10 pesewas. Moreover, the quality of drinking water which is supposed to be monitored by the Ghana Standards Board and the Food and Drugs Board remains questionable due to the fact that most independent producers operate without clearance and those who do are not consistently monitored. Water quality hardly meets the set quality standards because of the inefficient treatment techniques used by most producers and consumers which do not ensure the elimination of the pathogens as required (Ibid). Seventy percent of diseases in developing countries are related to the consumption of unsafe drinking water (WaterAid, 2005). As such, the improvement of drinking water in Ghana and Africa as a whole will reduce the high death rates related to water-borne diseases such as cholera, typhoid and dysentery.

The scarcity as well as the poor safety of drinking water in Ghana has sensitized institutions such as General Electric to come up with business solutions which seek to address the issues of safe drinking water. General Electric is a distinguished global American company operating in more than 100 countries worldwide over the past 100 years, with more than 300,000 employees addressing the world's toughest infrastructure challenges in the areas of energy, health care, water, aviation, railways, oil & gas and finance. Some business leaders in the company proposed the establishment of water shops in some of the most distressed areas in developing countries in order to enable the urban poor to afford safe "bottled water" while creating jobs, reducing water-borne diseases, helping the development of local water producers and increasing the number of commercial water shops.

The project anticipates a minimum installation of 10 water shops in the identified needy communities within the Accra Metropolis and Ga East and West districts. The total investment is estimated at US\$100,000, of which the local entrepreneur will contribute US\$10,000. Water will be sold at a rate of US\$ 0.05 per liter. An empty bottle (5 gallons) will be distributed for free during the project's inception and consumers will be required to use the empty bottle (5 gallons) to purchase their water then and thereafter.

On the other hand, regardless of price affordability and water accessibility, there is a need to size the market, understand the consumers and their needs in order to design a product that will best serve their needs and not just design what the company wants to offer. There is a need to assess the product offering by the company in terms of packaging, price, flexibility and usage by consumer. This is why market research aimed at interacting with the high, middle and poor urban income earners from Greater Accra Region specifically from the Accra Metropolis and Ga East and West districts through interviews and questionnaires.

Definition of key terms

- Safe or “potable” water is water exempt of any impurity intended for human consumption in terms of cooking and drinking. Nonetheless, many developing countries have monumental challenges in providing a sustainable supply of safe drinking water to its urban and rural communities. These challenges may be attributed to many reasons including the lack of sustainable finance, modern technology, adequate infrastructure, good maintenance culture, good management and population growth (Kwame, 2005).
- “Water shop” refers to the production and commercialization of bottled water in small shops. A franchise business on the other hand, is a business model

where the concept owner grants exclusive rights to a third party or an individual for the local distribution, sale and management of the production plant and receives in return a payment in conformance to quality standards (Combs & Castrogiovanni, 1994).

CHAPTER TWO

Literature Review

2. From public to private sector

Around the world, the majority of municipal water supply is often solely managed by the public sector. For instance, government was responsible for the water ownership and management in Sri Lanka, Honduras and Uganda (Hall & Lobina, 2008). However, the inefficiency of the public sector in addressing issues such as good management, reliable supply of high quality water and wider coverage, just to name a few, urged international institutions with the need to sensitize the various governments on the importance of **water privatization** in the early 1990s in order to curb this social problem.

Most municipal water agencies in developing countries are encountering similar challenges from disparity between supply and demand resulting from rapid population growth, inadequate management, inadequate revenue collection to sustain business operations and a lack of financial support for expansion and investment in water treatment plants. Consequently, the World Bank and International Monetary Fund advocated in the 1990s for the privatization of the water sector in some countries including Ghana so as to ensure equitable distribution, accessibility, availability and affordability of water by all classes of income earners (Hall & Lobina, 2008).

Water is defined as a social good when it improves the well-being of both the individual and the society as a whole. However, it is an economic good when the water has an economic value to more than one person (Gleick, Wolff, Chalecki, & Reyes, 2002). Nonetheless, the “Dublin Principles” states that, “water has an economic value in all its competing uses and should be recognized as an economic good” (Ibid). Based on this principle there is nothing wrong in privatizing water.

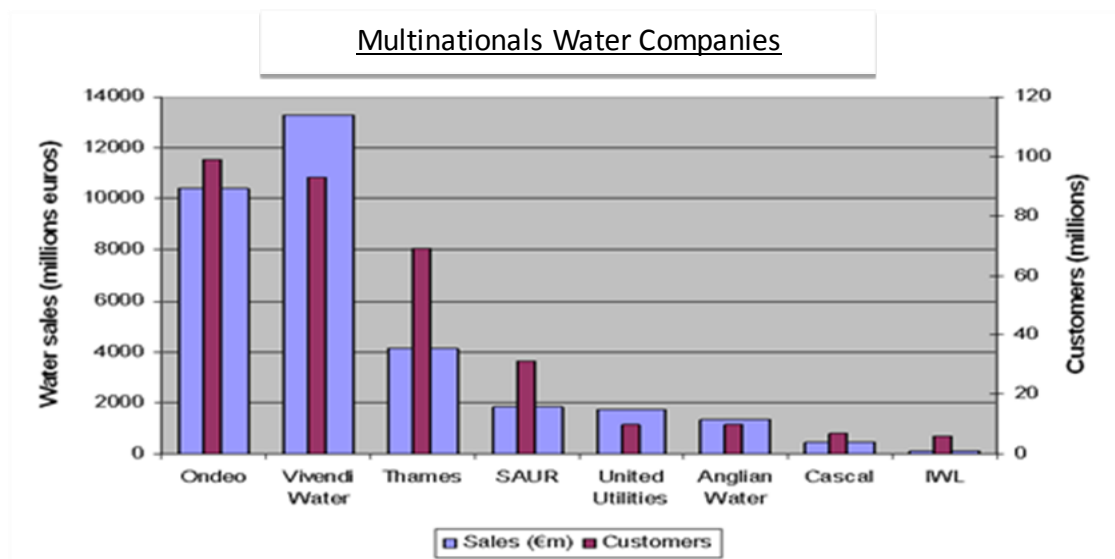
Water privatization involves the transfer of some, or all assets or operations of public water systems to private hands (Griffiths & Wall, 2005, p. 296). The privatization in Africa has generally been in a form of a lease or a concessional contract between the public and a private company. For instance, the South African Water Company (SAWC) had a thirty year concession in the Dolphin Coast with French company SAUR (a subsidiary of Bouygues and Vivendi) in 1999 while Guinea had a ten year lease with the French company SAUR and EDF in 1989 in order to improve service delivery and revenue collection (Bayliss, 2001). Privatization can definitely contribute to the improvement in water quality, reduction of water-borne diseases, improve the quality of life of communities and bring about economic development. However, the privatization of water has generated great controversy and debate over its sustainability and its impact on marginalized communities. Issues have been raised about how to manage water as an “economic good” and “social good” while protecting the public from price hikes (Gleick, Wolff, Chalecki, & Reyes, 2002)

There are two major schools of thought on the issue of water management. One that advocates for the **privatization** of water and the other, which advocates for the **nationalization** of water because of the belief that it is a vital factor contributing to human survival and well-being; hence, it should be protected from the market forces of price hikes. It is therefore important to understand privatization and its major impact on human life.

One might ask, “How firms improve their services and still charge a lower cost for them?” This can only be done if the service is subsidized or the services are derived from low quality material and equipment. Privatization can work if it is run with good management, government oversight and regulations aimed at ensuring that the interest of both suppliers and consumers are met.

2.1. Water Privatization

After sensitization by the World Bank and the International Monetary Fund in the 1990s, some multinational companies embarked on privatization. The four main French, English and German companies which embarked on privatization of water are SAUR (mostly operating in Africa), Suez (known as Ondo and Lyonnaise des Eaux), Veolia (previously known as Vivendi and Generale des Eaux) and Thames. Suez and Veolia shared 60% of the 320 million customers served by multinationals (Hall & Lobina, 2008).



Source: Hall & Lobina, 2008, p.7

Most companies used acquisition, lease, concessions and joint ventures as a strategy to penetrate the water market. As compared to other developed countries, private water sectors in developing countries are mostly managed by a large number of independent local entrepreneurs, community operators, and street vendors with lack of expertise and limited access to finance needed to expand and improve their infrastructure. In order to ensure that good quality of water is supplied to consumers in developing countries, some French and English multinationals such as SAUR, Vivendi,

Thames and Ondeo who have a significant expertise and experience worldwide expanded their business operation in Africa specifically in Mali, Senegal, Côte D'Ivoire, Gabon, South Africa and Guinea.

However, most of them are now skeptical and those who are already operating in developing countries are withdrawing or reducing their stakes (Hall & Lobina, 2008). Some of the reasons mentioned are exposure to currency risk, economic crises, public resistance to price increases (price elasticity of demand and revenue), government policies, and low return on investment. For instance, The UK water company Biwater closed their water supply project in Zimbabwe in December 1999 because they were not getting the desired required rate of return (Ibid. P.7).

2.3. Global conflict in water privatization

Water, which is primarily seen as a social commodity managed by the public sector should be affordable, accessible and equitably distributed to all in the society, might generate debate and controversy if privatized. This is because private institutions running this sector are more profit-oriented rather than customer-oriented unlike the public sector. Hence, they tend to increase prices, and focus on their target market, leaving the poor who cannot afford the market price to use other unsafe alternatives (Collignon & Vezina, 2000). Similarly, as the sectors become privatized with free entry and exit and less regulations, most companies tend to forgo the continuous quality improvement and environmental issues related to the production of water while focusing on their profit maximization and not on consumers' safety.

The debate over the impact of privatization lead to some memorable actions by the termination of some project contracts namely, the 40 year concession with Bechtel in Cochabamba (Bolivia-2000), Aguas del Aconquija 30 year concession (Argentina-1998), Suez Concession in El Alto (Bolivia-2005) while other countries such as Uruguay and

Netherlands made water privatizations illegal (Hall & Lobina, 2008). Moreover, Bolivians in Cochabamba and El Alto went on public demonstration in the year 2000 and 2005 respectively after the company Bechtel and Suez hiked their prices. Bolivian residents, specifically the low income earners were not able to afford the market price, although, the water was of good quality and accessible to all. As a result of the mounting protest, the respective governments were forced to terminate the contract of Bechtel and Suez. Furthermore, water became inaccessible, unaffordable and unsafe after the privatization by Suez Lyonnaise des Eaux in Johannesburg and Morocco as a result of increase in prices (Vanoverbeke, 2004).

2.4. Cases for the privatization of water

Most countries are now advocating for private ownership of water, due to population growth, and the public sector's inability to serve all communities with potable water. There is a need therefore for the private sector to play an active role in collaboration with the public sector to ensure an equitable distribution of safe drinking water. For example, in La Côte D'Ivoire and Senegal, the government is responsible for finance and expansion, whilst the private company Bouygues manages the maintenance and distribution of the existing plant at Sodeci and Senegalaise des Eaux (SDE) (Hall & Lobina, 2008).

2.5. Current state of bottled water in Accra Metropolis –Ga East & West districts

In Ghana, some of the most recognized brands of good quality water in sachet and bottled drinking water include Voltic, Dasani, Aqua Fresh, Aquafina, Everpure etc. Bottled water is mostly accessed by the middle and high income earners, leaving the poor who cannot afford it to settle for sachet water, hand-tied sachet water and other means of drinking water, which most of the time expose them to water-borne diseases and sometimes to death.

2.6. Conclusion

Safe drinking water is scarce, inaccessible and costly for some urban residents in Ghana specifically in the Accra Metropolis and Ga East and West Districts. As a result, residents who cannot afford the market price end up using other unreliable alternatives which in most cases are the causes of many water-borne diseases. According to a news report by Metro TV, at the time of writing this report (April 2011), there are currently about 4,200 recorded cases of cholera in Greater Accra Region after an outbreak in December 2010 (Kwaku, 2011). Sachets water also called “pure water” is a contributory factor to this outbreak due to people poor hygiene and improper sanitation behavior. This is why General Electric intends to use a franchise business model aimed at providing access to safe drinking bottled water to Ghanaians especially the poor, who are mostly vulnerable and marginalized in the society. If this project is implemented, more jobs will be provided for the youth, water quality will be improved, many water-borne diseases will be reduced, women will no longer walk long distances in their quest for water, hence, they will be more productive in their respective business activities and children will be able to show up on time for school because they will not have to fetch water from long distances. The perennial water shortage in the Greater Accra Region can only be address if the need of residents and service provider is assess. As such, a market need assessment was conducted in order to understand the market.

CHAPTER THREE

Methodology

Methodology is very crucial for the assessment of this water project in ensuring its viability. The main objective of conducting this research was to understand the commercialization of safe drinking water in the urban areas of the Greater Accra Region specifically the Accra Metropolis and Ga East and West districts to identify the gap in the distribution of water and access to safe drinking water, so as to find adequate means to address it. The results from this research will inform General Electric on whether to embark on funding the water shops in the context of the severity of the current water situation in Greater Accra Region whilst sizing up the market in monetary terms for potential investment.

1. Data types & sources

This research required both primary and secondary data so as to eliminate bias and ensure reliability and accuracy of data being collected. Primary data was derived from questionnaires, interviews and online surveys. The primary research provided information about the customers' needs and the viability of this project, while the secondary research enabled the researcher to know what has been done, how successful or challenging it was and how the researcher could leverage on them in recommending adequate solutions for the sustainability and viability of the water shop franchise project in Greater Accra Region.

3.1. Data collection period

The data collection was initially planned to take place during two weeks with the intention to visit Madina, Labadi, Nungua and Adenta for data collection. However, the feedback from the visit to the aforementioned locations was not encouraging, due to few

responses gathered. Consequently, the researcher was compelled to re-strategize for a more meaningful field research and meet the deadline for deliverables. An online questionnaire was then added to the in-person questionnaire. A period of one week was then used to conduct face to face interviews with some local operators namely GWCL, and Aqua Viten Rand Limited (AVRL) as well as local producers such as Aqua Descale (Labadi), Fresh Taste also known as Too Fresh (Ring Way Estate) and Smile Water (Nsawam).

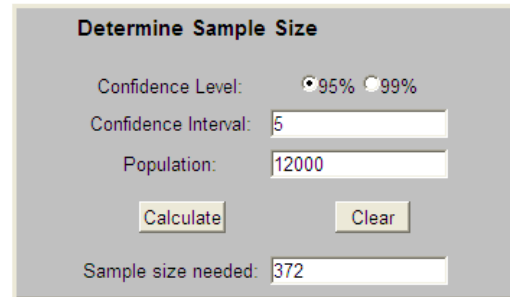
The researcher also met with the planning engineer and manager of Development and Investment from Ghana Water Company and then with its local contactor Denys Ghana Ltd for more insight and a possible partnership with General Electric. Another one month was used to administer an online questionnaire using kwiksurvey.com (Appendix 1). This is because, the middle and high income earners who are the targets of this study are most of the time busy and difficult to locate, hence providing them an online questionnaire to their respective email accounts was more effective. The sample included students, faculty of Ashesi University College and their respective families, friends and colleagues who live in Greater Accra Region and Ga East and West districts were used as the sample population for the online survey. In addition, an administered questionnaire was used to sample the urban poor in Madina (Libya quarters, Zongo), East legon (La Bawaleshie, American house) and Labadi (La Hospital, Kaklamadu). A period of one month was used to collect data from both online and in-person questionnaires.

3.2 Sample size

The researcher selected two locations in the Greater Accra Region namely, Accra Metropolis Area and Ga East and West districts. This is because; Greater Accra Region is one of the fastest growing areas in Ghana in terms of population growth (3%)

after the Ashanti Region (Ghana Statistical Services, 2005). Also, the interview with the Communications Manager of Aqua Viten Rand Limited (AVRL) revealed that those areas are among the most distressed areas in the

Accra Metropolitan Area, where water from the Ghana Water Company is unavailable or taps run once in a week or every three months. With the online sample size calculation tool (figure 1), the sample size for



The screenshot shows a web-based calculator titled "Determine Sample Size". It has three input fields: "Confidence Level" with radio buttons for 95% (selected) and 99%; "Confidence Interval" with a text box containing "5"; and "Population" with a text box containing "12000". Below these are "Calculate" and "Clear" buttons. At the bottom, a field labeled "Sample size needed:" displays the result "372".

Figure 1: <http://www.surveysystem.com/sscalc.htm>

this research was 372 considering 7,000 households from the respective selected locations with a confidence interval of 5% and a confidence level of 95 %. However, given the relatively limited scope of this academic research, the sample size was limited to 100 respondents being 50 online and 50 in-person questionnaires although 150 questionnaires were sent and 125 questionnaires were collected.

3.3 Sampling technique

The difficulty in gaining access to the target population who are the residents living in Greater Accra Region made it necessary to use purposive sampling. As such, an online questionnaire was made available to the targeted high and middle income earners using the Ashesi community, their friends and relatives as well as the researchers' personal network contacts through the use of an online survey tool (kwiksurvey) (Appendix 1). Similarly, snowball sampling was used because, due to the complexity of the water problem in Ghana, the researcher believed that it was more efficient and less time consuming in sampling and gathering data upon referral.

3.4 Limitations

The research was limited to the urban area although rural areas also encounter water inaccessibility, scarcity and affordability. The field research was also limited to selected areas of the Greater Accra Region although other areas face similar challenges. Language was an important factor in gathering information from a segment of our target market, as most participants in the urban poor were not fluent in English. In order to prevent any language barriers in this research, additional trained researchers from Ashesi University College and the Legon University of Ghana who speak some Ghanaian language namely Twi and Ga were involved so as to bridge the language barrier. In addition, secondary local information regarding population and housing census data were not easy to access. The researcher had to write a letter, make phone calls, pay some fees and visit the Ghana Statistical Service twice for information. Another limitation was non-response and dropouts from the sampled population which weakens the market need assessment. Similarly, some forecasts were based on outdated information as result of unavailability of updates and data were extrapolated based on the year 2000 figures.

CHAPTER FOUR

Findings & Deliverables

4. Demographic data summary

Attribute	Categories	Frequency	Percentage
Gender	Male	51	51%
	Female	46	46%
	No response	3	3%
Age	{16-25}	59	59%
	{26-35}	23	23%
	{36-45}	8	8%
	{46-Above}	4	4%
	No response	6	6%
Region	AMA	80	80%
	GA districts	20	20%
		100	
Connection to GWCL	Yes	74	74%
	No	26	26%
Service Providers	Management of GWCL	2	29%
	Local Producers	3	43%
	Management of AVRL	1	14%
	Local production plant Developer contractor (Denys Ghana Ltd)	1	14%
Consumers	Residents	100	100%
Sources of drinking water	Tap	34	30%
	Bottled	13	11%
	Sachets	51	44%
	Bulk(Buy in bucket)	10	9%
	ALL	7	6%
Brand used	Voltic	32	32%
	Ice Cool	11	11%
	Mobile	7	7%
	Standards	12	12%
	Everpure	5	5%
	Other brands	33	33%

Attribute	Categories	Frequency	Percentage
Water storage	Polytank	48	48%
	Containers	26	26%
	Jerry cans	19	19%
	Polytank& Jerry cans	3	3%
	All	1	1%
	Others	1	1%
	No response	2	2%
Challenges faced	Scarcity of water	34	26%
	High price of water	17	13%
	Accessibility of water	28	22%
	Long queue	8	6%
	Low pressure from taps	42	33%
Number of people per household	[1-3]	18	9%
	[4-6]	37	19%
	[7-10]	24	12%
	[11-13]	6	3%
	[More than 13]	11	6%
	Total	96	49%
	No response	4	2%
Days taken to use up all stored water	[0-2 days]	8	8%
	[3-5 days]	31	31%
	[1-3 weeks]	28	28%
	[3-4 weeks]	17	17%
	I don't know	7	7%
	8 weeks	2	2%
	No response	7	7%

4.1. SME water Producer's needs & challenges

	Aqua Descalers	Fresh Taste/ Too Fresh	Smile water	GE water shop
Ownership	Mainly sole partnership	Sole proprietorship	Mainly sole proprietorship	Franchise
Start-up capital	USD 32,000	Unstated	USD 68,493	USD 100,000 (Entrepreneur Contribution:USD 10,000.00)
Product Package & Size	500ml sachet (30 per bag)	500 ml sachets (30per bag)	500ml sachet water(30/bag) 0.5 L &1.5L Bottle Water (24 &12blts /box)	5 gallon bottle (18.91 liters) and bulk water
Price/Cost	USD 0.13 per liter	USD 0.13	USD 0.13 per liter	USD 0.05 per liter
Annual Sales	USD 49,315.07	USD 10,666.66	USD 562,320	USD 50,000-100,000 per shop
Treatment technology	Single membrane filtration, UV, Antibacterial, Chlorine pellets	Filtration	Filtration and UV Light	Oxidation, Re-calcinations, RO, UF, post disinfection
Water source	Mostly pipe borne	Mostly pipe borne	Underground spring	Borehole



Local operator filters

vs.



GE Reverse Osmosis technology

Research revealed that most local entrepreneurs cannot produce at maximum capacity due to challenges such as insufficient storage facilities, lack of access to modern equipment, unreliable source of water, inexperienced staff, fragmented distribution and unreliable transport facilities. For instance, a local producer at Labadi, who has been in operation for the past 4 years, does not have a reliable supply of water for their water production. They get water from a community borehole at Labadi which does not flow consistently. Production is run from Monday to Saturday while Sunday is used for the fetching water. Water collected is stored in the polytanks (1000 Liters) treated with chlorine pellets, then filtered and bagged into sachets with a packaging machine (KOYO).

A local operator at Ringway Estate, however, has been in operation for the past six years and produces sachet water with tap water which is also stored in four tanks with a total capacity of 1000 liter each. According to the manager, water is then filtered and bagged for storage or delivery to end consumers. Observation made reveals that only few filters were used during production although they needed frequent replacement that was not done. The bags of sachet water were kept on the floor and some in an open place outside, which would easily facilitate contamination even before reaching the end consumers. Water, which is a vital element for human survival



Production factory at (Ring Way) March, 2011

should be produced under adequate hygienic conditions. Workers also did not have any professional garments during production to even prevent any particles or dirt from contaminating the water; neither did they have a certified chemist to test the quality of water being produced. In addition, visitors could enter the production room without

waering protective garments, washing their hands and so forth. Regardless of all challenges identified and the high cost of raw materials, the manager asserted that he could even produce more than what he is currently producing (2,600 bags per day (30 sachets per bag)) with the 24hrs production and 8 workers; whilst the one in Labadi produces up to 700 bags (30 sachets per bag) a day with 5 filters and one machine with an annual sale of USD 49,315. The company also intends to increase production and reach a wider market outside Accra only if there is a reliable water source, adequate storage facilities and vehicle for distribution.

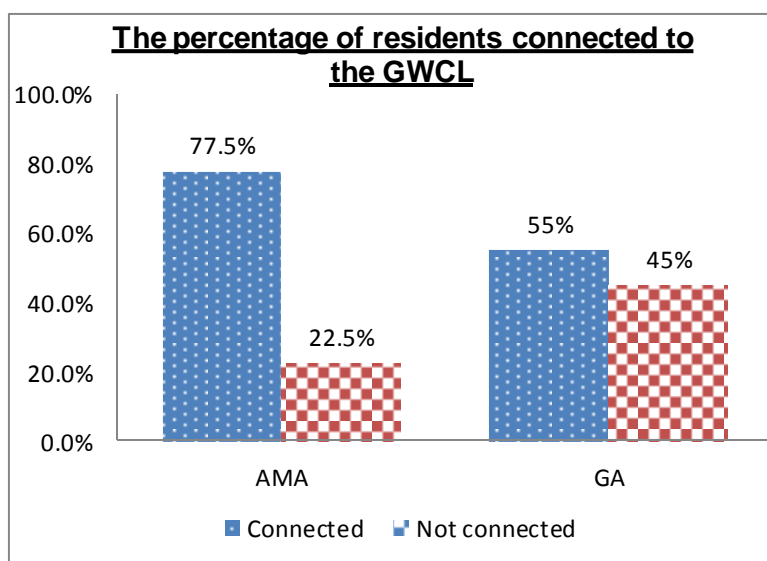
Most local entrepreneurs in the water industry have a sole proprietorship or partnership business. For instance, Aqua Descales, Fresh Taste and Smile Water under study are respectively limited liability partnership and sole proprietorship businesses with their production firm located at Labadi, Ringway and Nsawam within the Greater Accra Region. The comparison between these three firms reveals that one gets water from a community pipe borne and the other from underground spring. However, they all use the same treatment technique being a single membrane filtration, and no one can really ensure the frequency at which filters are changed. Price is quite fixed at USD 0.13 (10 Gp) per liter which might be subject to change as a result of increase in tariff and oil price.

4.2. Consumers need & challenges

4.2.1 Accessibility and affordability of safe drinking water

Our sample population revealed that 77.5% of residents in the Accra Metropolis are connected to Ghana Water Company (GWCL) as compared to 55% from the Ga East and West districts. Approximately 22.5% and 45% residents from Accra Metropolis and Ga East and West district do not get access to water due to low pressure

from the tap and their proximity to the main production plants at Weija and Kpong. The Pearson chi-square which is a statistical tool use to measure the relationship between two variables shows that there is a

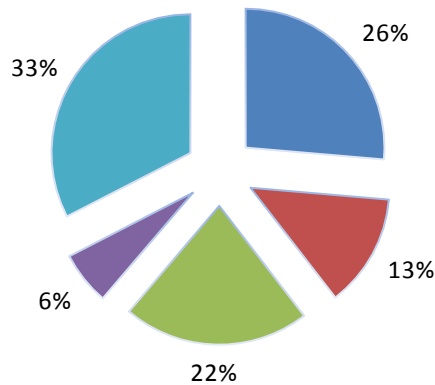


significant relationship between the place of residence and their connectivity to the GWCL distribution system. The significance of 3% which is below the 5% significance level shows that there is a significant relationship between the resident and their connection to the GWCL (See appendix 4 table 1).

Residents living at Madina (Ga East), Adenta (Ga west) and Teshie Nungua (AMA) do not get consistent supply of water for months. They end up using other alternatives such as water from boreholes, street vendors, community wells and tankers which are most of the time not treated. For instance, some tanker vendors get their supply from the GWCL while others just fetch it from rivers and lagoons and deliver it without any treatment to the end consumer at an exorbitant price.

Challenges faced by residents

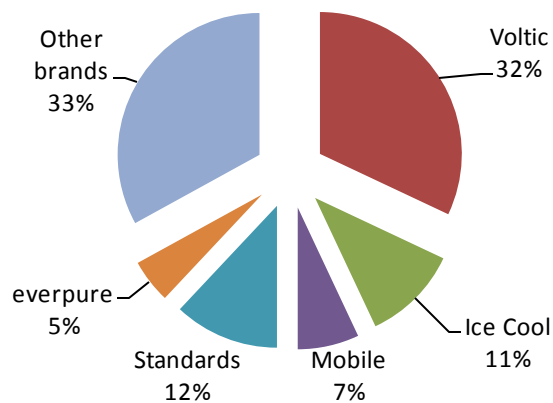
■ Scarcity of water ■ High price of water ■ Accessibility of water
■ Long queue ■ Low pressure from taps



Water scarcity (33%), low pressure from the tap (26%) and accessibility of water (22%) are the most challenging factors affecting the residents of the Accra Metropolis and Ga East and West districts. Although connected to GWCL distribution system, residents do not have consistent water supply through their taps. This is as a result of financial and infrastructural difficulties faced by Ghana Water Company (GWCL). Residents rely on bottled and sachet water for their drinking water and make use of

other sources of water for domestic usage such as cooking, washing and bathing. Popular branded market players are Voltic, Ice Cool, Everpure, Standards, Mobile and other brands. Various sachet water producers

Brand used by residents



namely Voltic and other brands serve 65% of our sample population.

This is as a result of their strong distribution channels with convenience shops, supermarkets, hostels, hotels, retailers, wholesalers, and street vendors (hawkers) which makes their product available everywhere. For instance, a visit to Madina's Libya quarters where residents do not have water supply through their tap, Voltic and other brands were

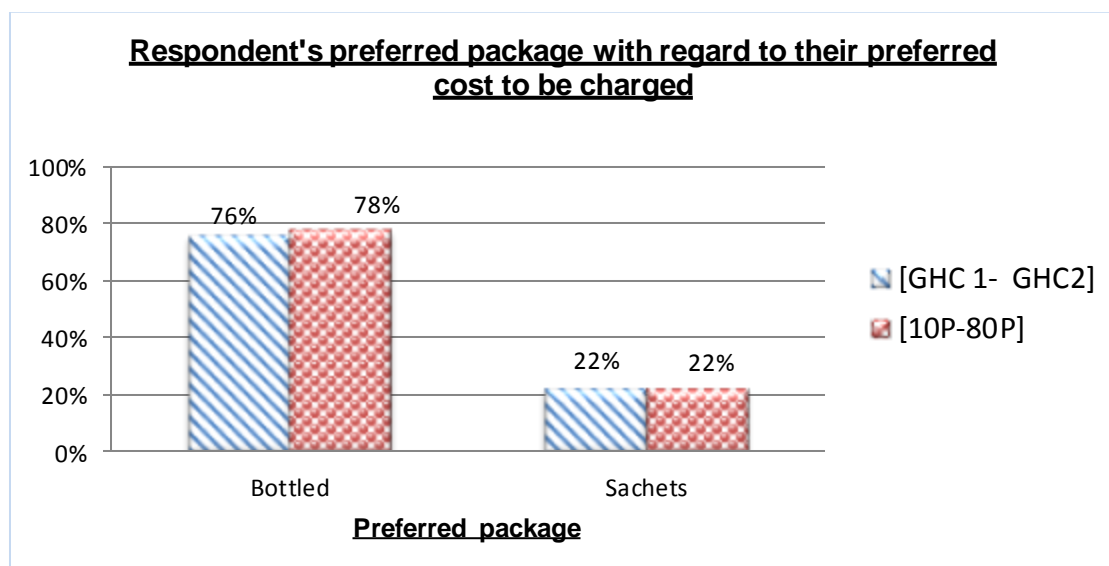


Typical local distribution vehicle

available in most shops. However,

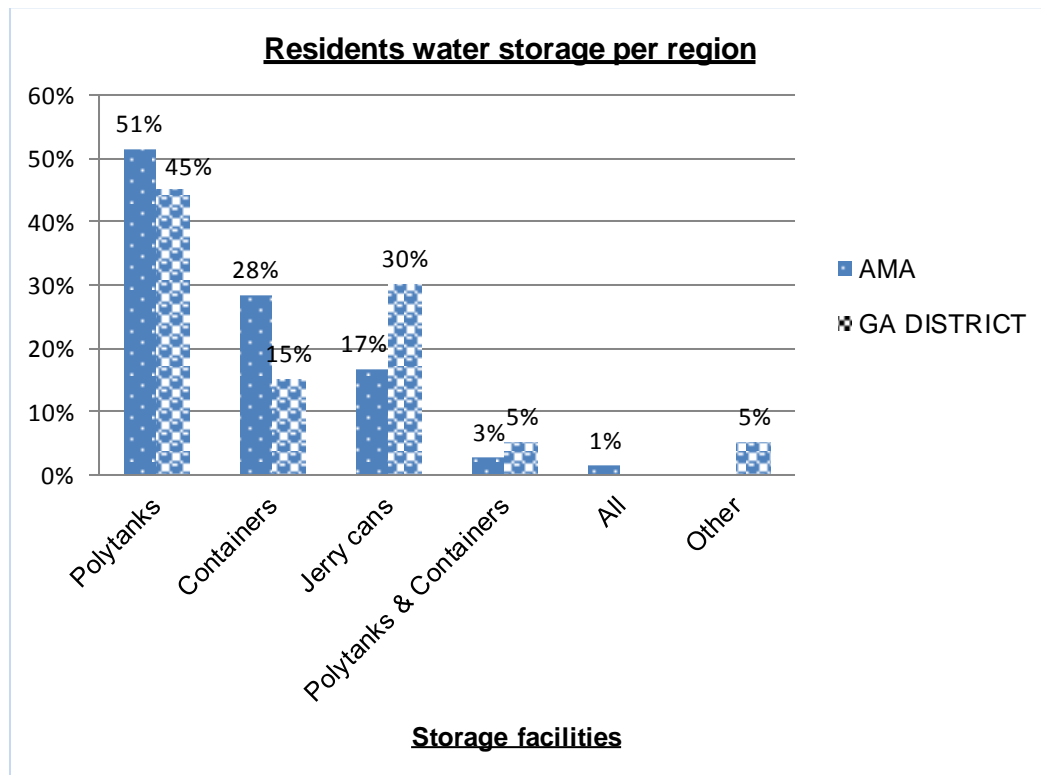
most poor residents in Accra Metropolis and Ga East and West districts rely on water in sachet (10Gp/500ml) instead of bottled water (70Gp/0.5L) which cost 7 times that of water in sachets. Poor residents are likely to substitute clean water (bottled water) for the purchase of food such as “kenkey” (30-40 Gp).

4.2.2. Consumers' wants and their willingness to pay



Although most people use sachet water, 78% of our sampled population prefers bottled water as compared to 22% who prefer water in sachets water. However, 78% residents are only willing to buy 1 litter of bottled water between (10Gp-80Gp) while 76% did not mind being charged between (GHC 1 and GHC 2). The sample size under study could generate totally different findings given a wider sample size. Currently, consumers pay higher prices for safe drinking water. One bag of “unpopular” sachet water sells between 80Gp to GHC 1 while one bag of “popular” sachet water such as Voltic is sold between GHC1.2 to GHC 2 based on the location and retailers. Moreover, the 5 gallon bottle is currently sold for GH 21 (GH16 for the empty bottled and 5 GHC for water refill) which is quite expensive for residents who cannot even raise GH15 for a month.

4.2.3. Quality of water



Most residents from our sample population at Accra Metropolis and Ga East and West districts do not drink water from the tap. This is because consumers believe that the

water is not of good quality as sometimes they find particles or the water tends to be discolored. However, the Communications Manager of Aqua Vitens Rand Limited attributes it to other factors during transportation and distribution and not production. Consequently, most residents drink bottled and sachet water from independent vendors while storing water in polytanks, jerry cans and containers for domestic use, which are not consistently maintained and stored in a good condition so as to prevent any contamination.

Subsequently, people are more vulnerable to water-related diseases due to their improper storage and sanitation. In addition, most local water producers produce under very unhygienic conditions with improper storage facilities, irregular maintenance and cleaning and unreliable water sources. Water produced is kept on the floor, stored in open spaces, and handled without any gloves. Similarly, water is distributed in improper and dirty trucks where flies can lay their eggs on the bags of sachets and other microbes can fall on it with the air blowing on the bags. Even the most popular and supposed high quality brand such as Voltic, Everpure, Standard and Mobile have most of their distribution vehicles opened. Therefore, there is a need for an innovative technology for production and distribution of water by local operator so as to ensure safety to the end consumers. However, before planning and strategizing for the new solution in curbing the aforementioned problems, an analysis of the market size and financials was done in order to assess the viability of this project for prospective investment.

5. Market sizing

Forecasted population using the year 2000 as the base (GSS, 2005)

	2010	2011	2012	2013	2014	2015
Greater Accra (3%)	3,909,764	3,909,764	3,909,764	3,909,764	3,909,764	3,909,764
Accra Metropolis (3%)	2,269,000	2,269,000	2,269,000	2,269,000	2,269,000	2,269,000
GA Districts (2%)	550,468	550,468	550,468	550,468	550,468	550,468

GWCL Forecasted Supply and Consumption by 2012

	M ³ /day	M ³ /Month	M ³ /Year
Water demand	535,913	16,077,390	192,928,680
Water supply	386,000	11,580,000	138,960,000
Deficit	149,913	4,497,390	53,968,680

NB. Population growth rate was calculated based on the actual figure from GSS Greater Accra Region population and housing census 2000 and 2010. The 2012 forecast was obtained from GWCL.

5.1. Drinking Water Market sizing

Drinking water						
	2010	2011	2012	2013	2014	2015
Greater Accra Pop (3% growth)	3,909,764	4,027,542	4,148,868	4,273,849	4,402,595	4,535,219
Accra Metropolis Pop (AMA)	2,341,180	2,415,656	2,492,502	2,571,792	2,653,605	2,738,020
Ga districts	671,014	684,434	698,122	712,084	726,325	740,851
Total Available Market (TAM)	6,250,944	6,443,198	6,641,370	6,845,641	7,056,200	7,273,239
Unattracted Available Segment(UAS)	1,840,130	1,896,289	1,954,188	2,013,880	2,075,421	2,138,869
Serve Available Market (SAS)	4,410,814	4,546,909	4,687,182	4,831,761	4,980,779	5,134,370
Number of Household (SAS) (#4.5)		1,010,424				
Monthly consumption/household (20L) * 10 purchase		10				
Price/ 20 Litter of water		\$1.30				
U\$ Serve Available Segment/Month		\$13,135,512				
U\$ TAM p.a		\$223,364,076				
U\$ UAS p.a		\$65,737,932				
U\$ SAS p.a		<u>\$157,626,144</u>				

NB. This includes both consumers who are not connected to the piped water system, and consumers who are connected, but receive irregular service. These households pay rates far in excess of those who rely on water from the piped system.

5.2 Bulk Water-Tanker Market Sizing

Bulk water						
	2010	2011	2012	2013	2014	2015
Greater Accra Population (3% growth)	3,909,764	4,027,542	4,148,868	4,273,849	4,402,595	4,535,219
Accra metropolis area Population	2,341,180	2,415,656	2,492,502	2,571,792	2,653,605	2,738,020
Sampled AMA residents connected to GWCL but don't get consistent supply (78%)	1,826,120	1,884,212	1,944,152	2,005,998	2,069,812	2,135,656
AMA Not conneted (22%)	515,060	531,444	548,350	565,794	583,793	602,364
Ga Districts	671,014	684,434	698,122	712,084	726,325	740,851
GA residents connected to GWCL but don't get consistent supply (55%)		376,439	383,967	391,646	399,479	407,468
GA residents not connected (45%)		307,995	314,155	320,438	326,846	333,383
Total Available Market (TAM)		3,100,090	3,190,624	3,283,876	3,379,930	3,478,871
Unattrated Available Segment(UAS)		1,827,443	1,881,453	1,937,100	1,994,432	2,053,502
Serve Available Segment(SAS)		1,272,647	1,309,171	1,346,776	1,385,498	1,425,369
Number of Household (SAS)/ average # of household (4.5)		282,810				
Monthly consumption/household (1500 L)		2				
Price/1500 L		\$50.00				
U\$ SAS/Month		\$28,281,000				
U\$ TAM p.a		\$826,689,600				
U\$ UAS p.a		\$487,317,600				
U\$ SAS p.a		\$339,372,000				

NB. This includes both consumers who are not connected to the piped water system, and consumers who are connected, but receive irregular service. These households pay Eates far in excess of those who rely on water from the piped system in view of the fact that the pricing of tanker water supply is currently unregulated.

6. Financial projections

Business portfolio	
GE financing	90,000
Equity Contribution	10,000

6.1 Monthly cash flow projections for drinking water

M0 is the first month of initial investment

M1 to M11 are the second month to the twelve month of production and commercialization of water.

[illegible]

	M 0	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11
bottles/hr)												
Borehole and pumps(3 max)	15,845	-	-	-	-	-	-	-	-	-	-	-
Land / office lease(20 years)	10,000	-	-	-	-	-	-	-	-	-	-	-
Shop construction, furnishing & equipment integration	20,000	-	-	-	-	-	-	-	-	-	-	-
Material inventory costs												
5 gallon bottles (with faucet -\$14.52)	29,040	29,040	5,808	1,162	-	-	-	-	-	-	-	-
Chemicals	330	330	330	330	330	330	330	330	330	330	330	330
Operational costs												
Utility bills & govt. permits	170	170	170	170	170	170	170	170	170	170	170	170
Maintenance of equipment & fuel	-	-	323	326	329	332	336	339	342	346	349	353
operations van (5 ton) on 12 month lease purchase	833	833	833	833	833	833	833	833	833	833	833	833
17 kva diesel powered generator 12 month lease purchase	583	583	583	583	583	583	583	583	583	583	583	583
Admin costs, sales expenses, taxes, loan & interests												
Salaries & wages	900	900	900	900	900	900	900	900	900	900	900	900
Sales commisions, mgt & staff performance bonuses	-	-	2,710	1,322	1,044	989	978	976	975	975	975	975
Administrative costs	330	330	330	330	330	330	330	330	330	330	330	330
Industrial all risk insurance premium	500	500	500	500	500	500	500	500	500	500	500	500
Principal repayment on franchise loan (36 months repayment)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500

	M 0	M 1	M 2	M 3	M 4	M 5	M 6	M 7	M 8	M 9	M 10	M 11
Franchise management fees to jvc @ 5% of monthly turnover		-	2,710	1,322	1,044	989	978	976	975	975	975	975
Branding & advertisement contribution		-	4,878	2,380	1,880	1,780	1,760	1,756	1,170	1,170	1,170	1,170
Training	600	600	-	-	600	-	-	600	-	-	600	-
Office computer & internet connectivity	1,070	1,070	103	103	103	103	103	103	103	103	103	103
Total Outflows	-	36,856	22,678	12,760	11,147	10,339	10,300	10,895	9,712	9,715	10,318	9,722
Interest on franchise loan @ 10% p.a. fixed	250	250	250	250	250	250	250	250	250	250	250	250
Net Cashflow	-	(37,106)	31,273	13,430	9,491	9,189	9,005	8,366	9,541	9,536	8,932	9,528

6.2 Monthly profit & lost account projection analysis for drinking water

	M1	M2	M 3	M 4	M 5	M 6	M7	M 8	M 9	M10	M 11	M12
	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
Sales		54,200	26,440	20,888	19,778	19,556	19,511	19,502	19,500	19,500	19,500	19,500
Cost of inventory	29,370	6,138	1,492	330	330	330	330	330	330	330	330	330
Gross margin		48,062	24,948	20,558	19,448	19,226	19,181	19,172	19,170	19,170	19,170	19,170
Pre-operational expenses	10,000	-	-	-	-	-	-	-	-	-	-	-
Operational expenses (manufacturing)	1,586	1,909	1,912	1,915	1,918	1,922	1,925	1,928	1,932	1,935	1,939	1,942
Admin costs and sales expenses	5,900	14,631	9,357	8,902	8,091	8,049	8,640	7,453	7,453	8,053	7,453	7,453
Depreciation (on equip. @ 20% for 5years)	1,461	122	122	122	122	122	122	122	122	122	122	122
Gross profit		31,401	13,558	9,619	9,317	9,134	8,494	9,669	9,664	9,060	9,656	9,653
Taxation (25%)		7,850	3,390	2,405	2,329	2,283	2,124	2,417	2,416	2,265	2,414	2,413
Net profit		23,551	10,169	7,215	6,988	6,850	6,371	7,252	7,248	6,795	7,242	7,240
Return on investment		58%	51%	46%	47%	47%	44%	50%	50%	46%	50%	50%

6.3 Drinking water annual cash flow projection over 6 years of operation for drinking water

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	USD	USD	USD	USD	USD	USD
INFLOWS						
Sale of water @ \$ 1.29 / 5gallon bottle (liquid content only), 15% increament	214,500	246,675	283,676	326,228	375,162	431,436
Sale empty 5 gallon bottles with faucet \$ 17.35 per bottle	43,375	8,675	1,735	347	69	14
Total inflow	257,875	255,350	285,411	326,575	375,231	431,450
Outflows						
Material inventory costs						
5 gallon bottles (with faucet - \$14.52)	36,010	7,202	1,440	288	58	12
Chemicals *8% increament	3,960	3,992	4,024	4,056	4,088	4,121
Operational costs						
Utility bills & govt. permits, 5% increament	2,040	2,142	2,249	2,362	2,480	2,604
Maintenance of equipment & fuel, 5% increament	3,730	3,917	4,113	4,318	4,534	4,761
Operations van (5 ton) on 12 month lease purchase	9,996	9,996	9,996	9,996	9,996	9,996
17 kva diesel powered generator 12 month lease purchase	6,996	6,996	6,996	6,996	6,996	6,996
Admin costs, sales expenses, taxes, loan & interests						
Salaries & wages	10,800	10,800	10,800	10,800	10,800	10,800
Sales commisions, mgt & staff performance bonuses(5% increament)	12,894	13,539	14,216	14,926	15,673	16,456
Administrative costs (2% increament)	3,960	4,039	4,120	4,202	4,286	4,372
Industrial all risk insurance premium	6,000	6,000	6,000	6,000	6,000	6,000
Principal repayment on franchise loan (36 months repayment)	30,000	30,000	30,000	-	-	-
Franchise management fees to jvc @ 5% increament	12,894	13,539	14,216	14,926	15,673	16,456
Branding & advertisement contribution	20,284	20,690	21,103	21,526	21,956	22,395
Training	2,400	2,400	2,400	2,400	2,400	2,400
Office computer & internet connectivity	2,203	1,102	1,102	1,102	1,102	1,102
Total outflows	164,166	136,352	132,774	103,898	106,042	108,471
Interest on franchise loan @ 10% p.a. fixed	3,000	3,300	3,630	3,993	4,392	4,832
Net cashflow	90,709	118,998	152,637	222,676	269,190	322,979

6.4 Drinking water annual Balance Sheet projections over 7 years of operation

	Year1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Assets							
Non-Current Assets							
Property, plant and equipment	63,081	69,389	76,328	83,961	92,357	101,593	111,752
Prepaid land& office lease	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Total Non-Current Assets	73,081	79,389	86,328	93,961	102,357	111,593	121,752
Current Assets							
Inventories	39,970	47,964	57,556	69,067	82,881	99,457	119,349
Total Current Assets	39,970	47,964	57,556	69,067	82,881	99,457	119,349
<u>Total Assets</u>	<u>113,051</u>	<u>130,008</u>	<u>149,509</u>	<u>171,936</u>	<u>197,726</u>	<u>227,385</u>	<u>261,493</u>
Liabilities							
Current Liabilities							
Tax	32,302	32,302	32,302	32,302	32,302	32,302	32,302
Long-term loans	30,000	30,000	30,000	30,000	30,000	30,000	30,000
<i>Total Current Liabilities</i>	62,302	62,302	62,302	62,302	62,302	62,302	62,302
Total Liabilities	62,302	<u>68,532</u>	<u>75,385</u>	<u>82,924</u>	<u>91,216</u>	<u>100,338</u>	<u>110,372</u>
Total Equity	<u>50,749</u>	<u>61,476</u>	<u>74,124</u>	<u>89,012</u>	<u>106,510</u>	<u>127,047</u>	<u>151,121</u>

Estimation of the Weighted Average Cost of Capital WACC

WACC = $Re \times E/V + Rd \times (1 - \text{corporate tax rate}) \times D/V$	
Cost of Debt(D)	USD 90,000
Cost of Equity(E)	USD 10,000
Return on Equity (Re)	57%
Return on debt (Rd)	10%
Corporate tax	25%
Total investment (V)	USD 100,000
WACC	12%

Financial Assumptions

- The cashflow analysis is for 10,000 Liters /Day with 100% monthly production capacity of 300,000 Litres / month
- All Figures are estimated in dollars.
- 1 MONTH = 30 Days. 1 Bottle = 20L . \$1=GHC 1.5
- Selling price: \$ 1.30/20L Bottle and \$ 17.35 per empty bottle with faucet
- Sales of water: Capacity is 100% from start and sales remains constant through the year.
- Sales of bottle water: Once acquired, it only needs refilling
- Utility bills is constant, however a 5% increment will be affected P.A. in the yearly cash flow.
- Maintenance and fuel cost @ 1% increment per month.
- The salary remains constant throughout the year with 4 employees to manage the watershed; 1 manager and three assistances.
- Advertisement is 9% for the first six months and 6% for the following 6 months to create public awareness

- Sales commission is 5% of total monthly inflow
- Corporate tax is 25% of gross profit margin
- Depreciation on equipment is 20% over 6 years
- Franchise management fees at 5% of monthly turnover
- Interest on franchise loan fixed at 10% P.A.

Sales-The sales were meant to increase by 15% over the years taking into account the macroeconomics environment of the country, population growth and the high need and demand for affordable water.

Cost of Sales - Selling & Administration - Finance- Other income - cost was calculated using respectively the value of the obtained in year 2 times the ratio of sale in Year 1 current and year 2.

Tax- Tax was calculated using a fix corporate tax rate of 25% throughout the years.

Property, plant & equipment - was grown at 10% over the years taking into account acquisition of new equipment and expansion of production plant.

Depreciation- was obtained by using the depreciation value in year 1 over the property, plant & equipment.

Total Assets and total liability- was respectively estimated with a growth of 15% and 10% over the years as a result of high demand for the propose solution which will require more expansion and investment.

NB. All other figures were just estimate based on the Nigeria (Kaduna) water shops monthly cashflow and profit or loss account by Wattcon Company

CHAPTER FIVE

5.1. Conclusion

Access and affordability of safe drinking water is one of the various problems faced by people in many African countries. In Ghana, even though water seems to be accessible for some residents in the urban areas specifically in Accra Metropolis and Ga East and West districts in a form of sachet or bottle (0.5L, 1.5L & 20L). A recent study conducted by the Ghana Chemical Society reveals that 85% of the locally produced sachet water is unsafe and does not meet the required standard for consumer's health (Boadua, 2011). In addition to that, most cheap locally produced sachets water are produced, treated and stored in poor hygienic conditions while the cost of safe drinking water from trusted brands such as Voltic, Everpure and Ice cool are quite expensive for certain residents, specifically the urban poor, who do not have the required means to afford the market price. As such, they are left with the use of other alternatives at a cheaper cost which are most of the time of poor quality exposing them to water-borne diseases such as cholera, diarrhea, typhoid etc.

Furthermore, this research also reveals that there is a need for bulk water for domestic and industrial consumption. Residents in distressed areas as well as areas where water supply is inconsistent such as Teshie Nungua, East Legon, Adenta and Madina rely on tanker vendors for bulk water for domestic usage. However, due to unreliable supply by the GWCL, some of them use water from untreated sources such as lagoons to ensure delivery of service to consumers. Although water is not meant for drinking, residents can still contract skin infections. To sum it all, there is a need for affordable and safe drinking water as well as water for domestic and industrial consumption. With the Ghana Water Company Limited's (GWCL) inability to supply

potable water to all residents, the water shop franchise business model which seeks to provide the commercialization and production of water in communities will ideally address the water issues in Greater Accra Region by creating more jobs for the youth, improving the water quality and reduce the water-borne diseases for a better Ghana. The financial analysis of the estimated profit and loss account reveals that assuming every assumption made constant, the franchisee will get a return of 57% on investment, which will enable the local operators to pay back their loan over a period of three years. Also, the weighted Average Cost of Capital (12%) enabled the calculation of the NPV which shows that the investors could embark on funding this project with the expectation to yield positive return.

5.2. Recommendations

The water shop franchise business concept can bring about water safety, reliability and accessibility to the needy Ghanaians only if the points below are addressed:

Policy Reform

The Ghana Food and Drugs board, PURC and Ghana Standard Board ought to come up with a new policy to ensure that every water producer meets the water standard quality and those who do not comply with the standards close down their factories. Recently, bans have been put on a number of local producers who do not comply with the quality standards. However, more needs to be done to ensure a constant adherence to the standards set by these agencies. General Electric can collaborate with the aforementioned policy regulators to establish a remote quality performance system to ensure a consistent control with those who have obtained clearance.

Packaging

Bottled water (20 L) is what has been proposed by the water shop franchise business model. However, assuming that the bottle costs USD 19.34 and water refill costs USD 1 (20L), some targeted consumers might not be able to afford the price of the bottle although the water will be cheaper. Nonetheless, “sachet water” cannot be considered for this model due to environmental issues and the contamination of water which the water shop seeks to address with the viability of the water shop concept. As such, the water shop operators need to put a system in place, whereby those who have been proven unable to pay upfront for the purchase of bottle will have an account created with the shops that will enable them to pay by installment until they own the bottle. What is unique about the bottle is the faucet attached to it which enables consumers who do not have dispensers to efficiently use it without contaminating the water. Therefore, it is imperative for each consumer to have their own bottle.

Similarly, it will be important to continuously sensitize consumers about the usage of their bottle since it is likely that after purchase of the bottle some consumers may decide to store other sources of water in them. Furthermore, most consumers are very active and work away from their house, as such; it will be impractical for them to carry along the 5 gallon bottle. Some consumers can even decide to pour some in another container which, no one can ensure the water safety during transfers. Consequently, it will be good to make provision for small package of 300ml, 500ml and 1 L.

Bulk water

The research reveals that there is an important market for bulk water for both those who are connected and not connected to the GWCL within the Greater Accra Region region. Also, the forecasted population of Greater Accra and the Ghana Water

company deficit of 149,913 m³ /day by 2012 shows that provision has to be made to amend the business model so as to serve the need of that market as well.(See page 30-31)

The water shop operators or local partners should buy or lease water tankers for delivery to end consumers on contract, daily or on weekly basis. As such, two or three tanker vendors per water shop will be regularly maintained and inspected to ensure consistency and conformity to a certain quality standard. This water tanker delivery service could be a way to strongly penetrate the market and gain customer loyalty before introducing the bottle solution.

Distribution

The initial business model looked at purchase at the point of production, however, this research reveals that 78% of respondents prefer door-to-door delivery service. Considering consumers' wants and what other bottling competitors in the market do, it will be good to include a diversified distribution channel with delivery to convenient shops, supermarkets and door-to-door after identifying potential distributors with good storage facilities and hygienic environments. New transportation vehicles that are completely covered should be provided so as to avoid any contamination during delivery while differentiating the GE brand from that of competitors.

Similarly, most residents in the Greater Accra Region have taps in their houses with inconsistent water supply, therefore, GE can have a Private Public Partnership (PPP) agreement with the Ghana water company who will buy water from the water shop and serve it to its current client in those areas so as to enable residents in those communities and its neighborhood access to safe water for domestic and industrial usage.

5.3 Way forward

The total estimated market size for water in Accra Metropolis and Ga East and West district is \$1,061 billion (\$234 drinking water and \$827 bulk water). However, considering the market unattractiveness to General Electric (GE) in terms of low market share, low growth rate and competitors, the only available market for GE will be \$498 billion per year for both bulk and drinking water. Although, the research did not cover a wider market for the need assessment and market sizing there is still an opportunity for investment in the Ghanaian water sector. For instance, the fifty seven percent returns on investment, the positive Net Present Value (NPV) and the Weighted Cost of Capital (WACC) of 12% shows that the project is viable and for every dollar capital invested there is four dollars and five cent of return. Consequently, General Electric can invest in the proposed business model after:

1. Seeking further financial analysis by experts due to the fact that most of the data analysed was based on outdated information and estimations.
2. Identifying local investors and site for the project
3. Preparing a turnkey business plan for bulk water
4. Identifying potential site and get expert to test the soil and the borehole water contents
5. Engaging the Government in the project.

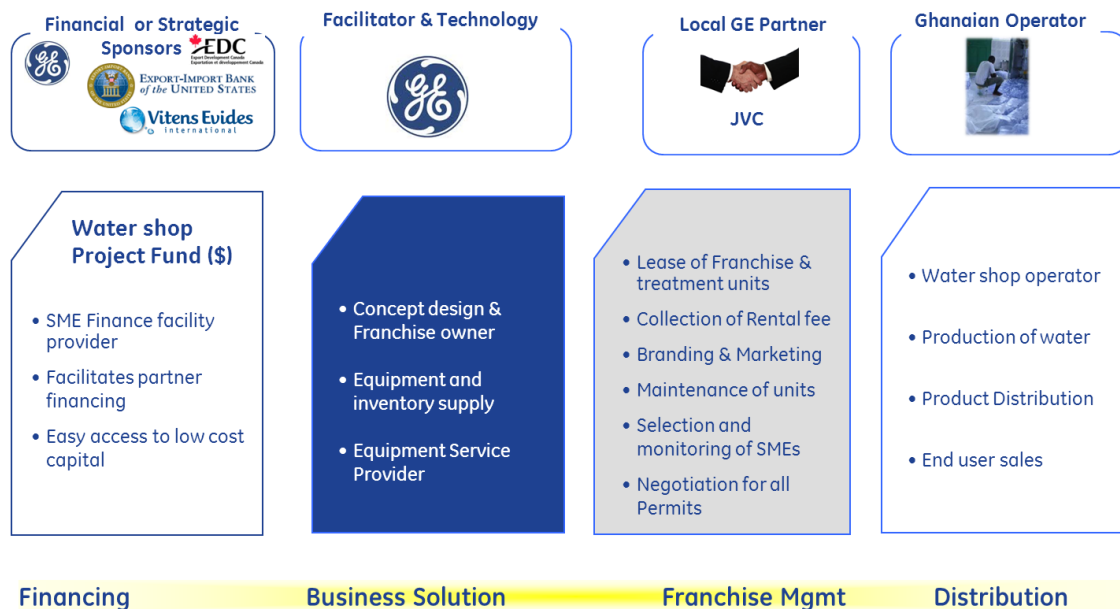
Bibliography

- Bank of Ghana. (2010). *News series of Gross Domestic Product estimate: Highlight of the rebased series of GDP*. Accra: Bank of Ghana.
- Bank of Ghana.G. (2010). *Bank of Ghana Monetary Policy Committee Press Statement*. Accra.
- Barot, J. (2007). *Water security: Life-giving, Life-saving*. World Health Organization.
- Bayliss, K. (2001). *Water privatisation in Africa: lessons from three case studies*. London: Public Services International Research Unit.
- Boadu, K. A. (2011, March Wednesday). Sachet water not good for you. *Daily Graphic*, p. 3.
- Boadua, K. (2011, March 24). Sachet. *Ghana daily graphic*, p. 3.
- Business & Financial Times. (2011). 2010 Population and housing census: Provisional results at a glance. *Business & Financial Times*, P.21.
- CIA World Factbook. (2009). Retrieved December 15, 2010, from CIA World factbook: <https://www.cia.gov/library/publications/the-world-factbook/geos/gh.html#>
- Collignon, B., & Vezina, M. (2000). *Independent water and sanitation providers in African Cities*. Washington D. C: World Bank water and sanitation program.
- Combs, J., & Castrogiovanni, G. (1994). Franchisor strategy: a proposed model and empirical test of franchise versus company ownership. *Journal of Small Business Management*.
- Durieux, F. (2010). *Water shop: A business model for bringing safe drinking water to developing countries*. France: General Electric.
- Ghana Statistical Services. (2005). *Ghana 2000 population and housing census: Accra Greater Accra Region*. Ghana statistical service.
- Gleick, P., Wolff, G., Chalecki, E., & Reyes, R. (2002). *The risks and benefits of globalization and privatization of fresh water*. California: Pacific Institute for Studies in Development, Environment, and Security.
- Griffiths, A., & Wall, S. (2005). *Economics for business and management: A student text*. England: Prentice Hall.
- Hall, D., & Lobina, E. (2008). *Water privatization*. London: Public Services International Research Units, University Of Greenwich.

- Hockenbury, D. H., & Hockenbury, S. E. (2006). *Psychology*. New York: Worth Publishers.
- Kwame, P. (2005). *Review of the performance of Ghana Water Company Limited 1998-2003*. Retrieved October 19, 2010, from http://www.purc.com.gh/5_yr_review12th_draft_21.1.05.pdf
- Okioga, T. (2007). *Water quality and business aspects of sachet water-Vended water in Tamale, Ghana*. Nairobi: Massachusetts Institute of Technology.
- PATH. (2007). *Safe water situation in four countries: 2007 findings in brief*. PATH.
- Vanoverbeke, D. (2004). *Water is Life*. Retrieved December 18, 2011, from Water Privatization conflicts.
- WaterAid. (2005). *Ghana water sector assessment*. London: WaterAid.http://www.wateraid.org/documents/plugin_documents/ghananationalwatersectorassessment.pdf
- WHO. (2010). *MDG 7: ensure environmental sustainability*. World Health Organization.

Appendix 1

Proposed Business model by the company



Provided link for the online questionnaire

Greater Accra Region water survey

This online questionnaire is to assess the availability, accessibility and affordability of water in your community. Your honest feedback might help stakeholders to provide safe and affordable water. Please tick or provide answers where needed. Do well to send it to your colleagues, friends and family as well. Follow this link below:

http://www.kwiksurveys.com/online-survey.php?surveyID=HCJJKH_bd014bf6

Appendix 2

Interview questions for the local water producers

1. What is your main business objective?
2. How much did you incurred in setting up this business? Do you have any partners? What is your initial contribution/equity?
3. Where are your finances coming from?
4. How many employees do you have?
5. What is your target market? What is your market size?
6. What are your market strategy (how do you position yourself in the market vis a vis competitors in order to reach out your target market)
7. What is your distribution channel?
8. Where are your customers located?
9. Where is or are your production plant(s)?
10. What is your brand? How strong is it?
11. How are you able to differentiate your product?
12. Where do you get your water from?
13. Would you use well water?
14. What treatment technology do you use?
15. What are your Strengths, Weaknesses, Opportunities, and Threats?
16. What are your annual / monthly production/sales over the years?
17. How long have you been in operation?
18. Who are your potential competitors? Can you tell us more about them?
19. Are they stronger than you? Why?
20. What are the standards in the industry?
21. Do you have to go to Ghana Standards Board or any other agency to get certification?
22. Are you constantly monitored? If yes, by whom? If no, why?
23. What is your profit after before and after tax?
24. What are the expenses incur in production? Please do state the cost?
25. Do you belong to any water association?
26. Are your distributions channel given any profits margin or commission?
27. What are your long term and short term goals?
28. Do you know of anyone who does the same business?

Appendix 3

Opinion water survey on Greater Accra drinking water

This questionnaire is to assess the availability, access and affordability of water in your community. Your honest feedback might help stakeholders to provide safe and affordable water. Please circle or provide answers where needed. Thanks for your cooperation

1. Where do you live?

.....

2. Are you connected to Ghana Water Company Limited distribution? If yes move to question 7 if no, continue answering.

a) Yes

b) No

3. How far is the source of drinking water from your house?

a) [1-5 min]

d) [15-20Min]

b) [6-10 min]

e) More than 22 min

c) [11- 14 Min]

f) Other.....

4. Where do you get your drinking water? (Choose as many as applicable)

a) Tap

c) Sachet water vendors

b) Tankers vendors

d) Bottled water vendors

e) Buy in buckets from

f) Other:.....

community

5. If bottled or Sachets, Which brand do you use?

.....

6. How often does water flow in your community?

a) Once a week (1)

d) Everyday

b) Twice a week (2)

e) Other:.....

c) Thrice a week (3)

f) Not at all

7. How many people live in your household?

a) [1-3]

e) [More than 13]

b) [4-6]

f) Other.....

c) [7-10]

d) [11-13]

8. How many hours per week are taps opened in your community?

a) [2-4hrs]

d) [11-13hrs]

b) [5-7hrs]

e) [14-16hrs]

c) [8-10hrs]

f) [17-24hrs]

9. How much do you spend on water in a week or a month if you do not have a household connection?
- | | |
|----------------|------------------|
| a) [GHC 1-5] | d) [GHC 21-30] |
| b) [GHC 5-10] | e) [GHC 31-40] |
| c) [GHC 11-20] | f) [Above GHC40] |
10. If you are connected to Ghana Water Company, how much do you spend on water per month?
- | | |
|----------------|------------------|
| a) [GHC 1-5] | d) [GHC 31-40] |
| b) [GHC 6-10] | e) [Above GHC40] |
| c) [GHC 11-30] | |
11. How do you store your water?
- | | |
|---------------|---------------|
| a) Polytanks | c) Jerry cans |
| b) Containers | d) Other..... |
12. If yes, what is the size of your Polytank or container from the main source?
- | | |
|---------------|----------------|
| a) 150 liters | d) 1000 liters |
| b) 250 liters | e) don't Know |
| c) 500 liters | |
13. How long does it take to fill up water in your Polytank or other containers?
- | | |
|--------------|----------------|
| a) [2-4hrs] | d) [11-13hrs] |
| b) [5-7hrs] | e) [14-24hrs] |
| c) [8-10hrs] | |
14. How many days or week does it take to use up all the water in your Polytank or other container?
- | | |
|----------------|-----------------|
| a) [0-2days] | d) [3-4 weeks] |
| b) [3-5 days] | e) Other..... |
| c) [1-2 weeks] | . |
15. How would you prefer your drinking water packaged?
- | | |
|------------|------------|
| a) Bottled | b) Sachets |
|------------|------------|
16. What size would you prefer?
- | | |
|-----------------|----------------------|
| a) [1 liter] | e) [50 gallons] |
| b) [5 gallons] | f) [Bag of sachets] |
| c) [10 gallons] | g) Others..... |
| d) [30 gallons] | |
17. How would you like your drinking water delivered to you?
- | | |
|------------------|----------------|
| a) Door to door | c) Retailers |
| b) Vending Point | d) Others..... |
18. How much do you want to spend on one liter of bottled drinking water?

.....
19. What are some of the challenges you are facing in your community concerning water?

- | | |
|---------------------------|----------------------|
| a) Scarcity of water | e) Low pressure from |
| b) High price of water | taps |
| c) Accessibility of water | f) Other..... |
| d) Long queue | |

20. How can the water problems in your community be improved?

.....
.....
.....

21. Gender

- | | |
|-----------|---------|
| a) Female | b) Male |
|-----------|---------|

22. Age

- | | | | | |
|-----------|------------|------------|-------------|----------------|
| a) [8-15] | b) [16-25] | c) [26-35] | d) [36- 45] | e) [46- above] |
|-----------|------------|------------|-------------|----------------|

23. Which of the following best describes your house?

- a) Compound house
- b) Single room self-contained
- c) Flat / Story building
- d) Apartment
- e) Villa
- f) Other.....

Appendix 4

Summary of findings-Statistical significance (Chi Square test) from SPSS

		Chi-Square Test Result	
Relationships between variables		Value	Significance
Region	Connection to GWCL	4.69	0.03
	Water storage	7.26	0.202
Preferred Package	Preferred cost to be charged	0.916	0.922